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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/536,561

05/25/2005

Antonino Toro

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EXAMINER

PARSONS, THOMAS H

ART UNIT

PAPER NUMBER

1745

MAIL DATE

DELIVERY MODE

08/08/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/536,561

Applicant(s)

TORO, ANTONINO

Examiner

Thomas H. Parsons

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1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 and 19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stedman (3,761,316) in view of Appleby et al. (20010033956).

**Claim 1:** Stedman in the sole Figure discloses an electrochemical generator comprising a multiplicity of membrane fuel cells (2, 38) provided with ribbed gaseous reactant distributor (18, 10), a multiplicity of cooling cells fed with liquid water (col. 2: 52-58), a device for feeding the gaseous reactants in a dry state (12, 20) and a device (27) for humidifying at least one of the gaseous reactants and for withdrawing heat by permeation of part of the liquid water fed to the cooling cells across a multiplicity of metallic porous walls (27) separating the fuel cells from the cooling cells, and by evaporation of the liquid water permeated to the interior of the fuel cells. See col. 1: 24-34 and 50-68, col. 2: 20-25, and col. 2: 50-col. 3: 45.

Stedman does not disclose reticulated gaseous reactant distributor.

Appleby et al. disclose replacing ribbed gaseous reactant distributor (flow field plate) by a three dimensionally reticulated porous gas reactant distributor (flow field plate). See paragraphs [96] and [117].

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have replaced the ribbed gaseous reactant distributor of Stedman with the reticulated gaseous reactant distributor of Appleby et al. because Appleby et al. teach a reticulated gaseous reactant distributor that would have assured a more effective removal of product water and prevent the accumulation of water droplets thereby improving the overall performance of the fuel cell.

**Claim 2:** Stedman in the sole Figure discloses that one of the cooling cells is interposed between each consecutive pair of the membrane fuel cells (2, 38).

**Claim 3:** Stedman discloses that the porous walls (27) consist of a metal sintered material with controlled permeability or of a metal fiber interlacement, optionally supported on a metal mesh or on an expanded or perforated sheet. See col. 3: 14-18 and 23-32 where, in particular, Stedman discloses a hydrophobic polymer impregnated metal, such as, for example, tetrafluoroethylene impregnated porous nickel.

• **Claim 4:** On col. 3: 9-10, Stedman discloses, “As will be understood by those skilled in the art, some means of holding the assembly together must be utilized.” It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided not only the assembly with a holding means but other components of the assembly such as the porous walls with a peripheral sealing frame to provide mechanical stability and integrity, and to prevent against leakage.

**Claim 5:** Stedman discloses that the porous walls (27) are superficially modified with a hydrophobic material on at least one face. See col. 2: 20-25 and col. 3: 14-18 and 23-32.

**Claim 6:** Stedman discloses that the hydrophobic material is a fluorinated polymer (e.g., tetrafluoroethylene) (col. 3: 14-18 and 23-32).

**Claim 7:** The rejection of claim 7 is as set forth above in claim 1 wherein further Appleby et al. disclose that the reticulated gaseous reactant distributor has a fluid passage resistance substantially lower than that of the porous wall. In particular, because Appleby et al. disclose a reticulated gaseous reactant distributor that is structurally the same as that instantly disclosed, it obviously would have a fluid passage resistance substantially lower than that of the porous wall.

**Claim 8:** The rejection of claim 8 is as set forth above in claim 1 wherein further Appleby et al. disclose that the reticulated gaseous reactant distributor is an element selected from the group of metal sponges or foams, of meshes, of expanded or perforated sheets or a superposition of such elements. In particular, Appleby et al. disclose that the reticulated gaseous reactant distributor consists of nickel foams and interlocking nets. See paragraphs [96] and [117].

**Claim 9:** The rejection of claim 9 is as set forth above in claim 9 wherein further Appleby et al. disclose that the reticulated gaseous reactant distributor is made of metal. See paragraphs [96] and [117].

**Claim 10:** Stedman discloses that the cooling cells comprise a conductive reticulated element to ensure the electric continuity (col. 3: 14-22).

**Claim 11:** Stedman discloses that the conductive reticulated element of the cooling cells has a fluid passage resistance substantially lower than that of the porous walls. In particular, because Appleby et al. disclose a conductive reticulated element that is structurally the same as

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that instantly disclosed, it obviously would have a fluid passage resistance substantially lower than that of the porous walls.

**Claim 12:** Stedman discloses that the conductive reticulated element of the cooling cells is an element selected from the group of metal sponges or foams, of meshes, of expanded or perforated sheets or a superposition of such elements. See col. 3: 23-32 where, in particular, Stedman discloses a porous metal sinter.

**Claim 13:** Stedman discloses that the conductive reticulated element of the cooling cells is metallic, and optionally consisting of stainless steel, nickel or nickel alloy. See col. 3: 23-32.

**Claim 14:** The rejection claim 14 is as set forth above in claim 1 wherein further Stedman, in the sole Figure, discloses a method for generating direct electric current, comprising feeding at least one dry gaseous reactant ( $O_2$  via 20 and  $H_2$  via 12) to the membrane fuel cell (2, 38), supplying a water flow (coolant liquid via 32) to the cooling cells at a controlled pressure higher than that of the at least one gaseous reactant to be humidified, and allowing the water flow to permeate to the membrane fuel cells across across a multiplicity of porous walls (27). See Stedman, col. 1: 24-34 and 50-68, col. 2: 20-25, and col. 2: 50-col. 3: 45.

**Claim 15:** Stedman, in the sole Figure, discloses that the wherein the gaseous reactant humidified by the flow of water permeating across the porous wall is oxygen.

**Claim 16:** Stedman, in the sole Figure, discloses that both gaseous reactants are humidified by the flow of water permeating across the porous walls.

**Claim 17:** The Stedman et al. combination does not disclose preheating the flow of water.

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However, one skilled in the art at the time the invention was made would know that giving heat to the cooling water so that as water flows through cooling plates, it starts and keeps boiling and is discharged as a two phase flow consisting of a liquid phase and a vapor phase thereby improving overall humidification and cooling of the fuel cell. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have preheated the flow of water.

**Claim 19:** The rejection of claim 19 is as set forth above in claims 1 and 9 above wherein further Appleby et al. disclose that the metal is selected from the group consisting of stainless steel, nickel and nickel alloys. See paragraphs [96] and [117].

### ***Examiner Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H. Parsons whose telephone number is (571) 272-1290. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
**PATRICK JOSEPH RYAN**  
**SUPERVISORY PATENT EXAMINER**

Thomas H Parsons  
Examiner  
Art Unit 1745

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